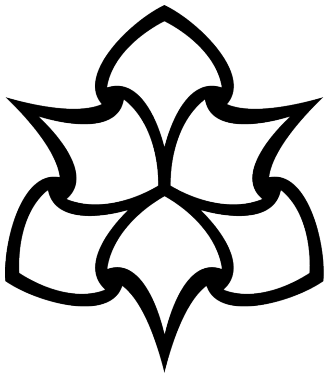

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Researching Research:
Mathematics Education in the Political

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Abstract: We discuss contemporary theories in mathematics education in order to do research on research. Our strategy consists of analysing discursively and ideologically recent key publications addressing the role of theory in mathematics education research. We examine how the field fabricates its object of research by deploying Foucault's notion of bio-politics – mainly to address the object "learning" – and Žižek's ideology critique – to address the object "mathematics". These theories, which have already been used in the field to research teaching and learning, have a great potential to contribute to a reflexivity of research on its discourses and effects. Furthermore, they enable us to present a clear distinction between what has been called the socio-political turn in mathematics education research and what we call a positioning of mathematics education (research) practices in the Political.

Key words: theory, research on research, learnification, mathematical specificity, discourse, ideology critique, bio-politics.

Introduction

The will to provide a quality mathematics education to all people plays a central role in the formation of mathematics education as a scientific field of research. At the beginning of the 1900s, when the *Commission International de l'Enseignement Mathématique* (CIEM or ICMI) was established, it was clear how the importance of teaching mathematics was conceived of as a social problem. In his review of the extensive work published to commemorate the one hundred years of *L'Enseignement Mathématique* (Coray, Furinghetti, Gispert, Hodgson, Schubring, 2003), Radford (2004) notes that mathematics could no longer be seen as a subject for elites who managed to climb to the highest levels of education. Parallel to the emergence of the concept of Humanity – men (sic) as a coherent rational subject, his own source of meaning, knowledge and action, where civilization was equated to scientific and technological progress – mathematics became a social need. The success of the civilised world depended on the inclusion of informed and participative masses. Thus, the teaching of school mathematics in modern, massive educational systems became an important element in constituting the rational, cosmopolitan minds of twentieth-century citizens (Popkewitz, 2009b; Radford, 2011).

In order to satisfy such societal demand, fields of research such as mathematics education emerged with the task of finding new ways of ensuring that the subject of mathematics in the

curriculum reaches all students. In the last three decades, mathematics education research has been growing exponentially, with various highly specialised topics being examined in regional, national, and international publications. This growing interest and the consequent diversity of approaches that characterises it have led researchers to raise the question of the identity of mathematics education as a research domain (e.g., Sierpinska & Kilpatrick, 1998; Steen, 1999). This discussion has been constant during the last decade, with a special emphasis on the role of *theory* (Sriraman & English, 2010a). A considerable amount of synthesis studies have presented a "state-of-the-art" of the different conceptual frameworks deployed in the field (e.g., Cobb, 2007; Lester, 2005; Silver & Herbst, 2007; Sriraman & English, 2005, 2010a). Even the existence of international groups devoted to carrying out meta-studies – the group on theory in mathematics education at the Congress of the European Research in Mathematics Education (CERME) (Prediger, Arzarello, Bosch & Lefant, 2008) – is a clear sign of the researchers' interrogation in a field of scientific enquiry.

When a field begins to raise questions not only about its primary object of study, but also about itself and its status as a science, this is usually called *reflexivity* (Bloor, 1976; Bourdieu, 2001). Such has been the case for many sciences that, at a certain point of their development, they turn back upon themselves to investigate their own ways of working.[1] The very first stage of reflexivity is that of research synthesis providing an overview of what the field knows about its research objects. Yet a more interesting level concerns the effects of research in generating particular discourses, with its encompassing ideologies. We argue that the recent boom in studies around what is and what counts as theory – including this very same special issue – is an important exercise of reflexivity that contributes new understandings of the objects of discussion (e.g., Radford, 2008), descriptions of the several theories used (e.g., Cobb, 2007; Silver & Herbst, 2007) and consideration of the affordances when combining multiple theoretical approaches (e.g., Arzarello, Bosch, Gascón, & Sabena, 2008; Gellert, 2008; Sriraman & English, 2010a). However, there are few studies exploring the effects of the area of academic enquiry (e.g., Duarte, 2009; Lundin, 2012; Martin, 2011). Our contribution to this special issue, considers the theoretical tools for a second level of reflexivity through the examination of mathematics education research, its discourses and effects.

[1] Some examples are the works of Clifford (1988) in anthropology, Bourdieu (2004) in sociology and Lakatos (1976) in mathematics.

In particular, we argue that any attempt to advance mathematics education as a field of scientific enquiry cannot be blind to the theses that it proposes about the objects of study, and what such theses make possible – and impossible – to research. Such a type of reflexivity is a step towards the realisation of understanding mathematics education as practices – even the use of the adjectives "social", "cultural", "political", "ideological", etc. with the noun is redundant since the field of practice is all of these attributes at the same time and inseparably. The so-called "social turn" (Lerman, 2000) and "political turn" (Valero, 2004; Gutiérrez, 2010) have provided awareness that the social, cultural and political "dimensions" of mathematics education are important to consider side by side the mathematical, cognitive and psychological ones. In doing so, researchers have imported theoretical frameworks from sciences other than the traditional psychology and mathematics, namely anthropology, sociology, philosophy, linguistics, psychoanalysis, critical theory, feminist and postcolonial studies. The fact remains, however, that, although these turns have started placing mathematics education in relation to social, cultural and political dynamics, the closure of the *object* of research to the learning of mathematics makes difficult a theorisation of the field as no other than the study of teaching and learning processes and contexts.

We can always argue that mathematics educators investigate a defined educational predicament, and that we should leave to sociologists, philosophers, political scientists, etc. the endeavour of studying the effects of our own field (cf., Fried, 2011). Indeed, some scholars have found in mathematics education research a prolific source for analysis (e.g., Dowling, 1998; Lave, 1988; Walkerdine, 1988). But there are at least two reasons for mathematics education to embark on this task. First, contrary to the opinion that a displacement of the object of study can lead to the dilution and loss of identity of the field (cf., Eisenberg & Fried, 2009), reflexivity is needed if mathematics education aspires to constitute itself as a credible field of research. Second, the contribution of mathematics through education to the constitution of different societies has escaped the eye of social scientists, with few exceptions (e.g., Popkewitz, 2008). Mathematics educators operate in an interdisciplinary field that could contribute not only to the understanding of pedagogical problems but also the significance of that pedagogy in the social and political sphere.

In order to make our case, we have done research on theory research. We systematically analysed key publications that in the recent years have discussed theory in mathematics education and existing approaches. We deployed two sets of theoretical tools to make evident how mathematics education research has been primarily focused on developing optimal learning

scenarios for mathematics, namely the focus on learning and the specificity of mathematics that distinguish it from other fields of educational research. Such discourse is analysed in reference to Foucault's (1997) concept of *bio-politics.* We also take advantage of Slavoj Žižek's (1989, 2006) *ideology critique* to show how "mathematical learning" has become the sublime object of the field's ideology and, as such, a stumbling block in the process of reflexivity. We conclude by suggesting a displacement in the way we conceive the importance of school mathematics. Such a displacement has important consequences for the way we perceive the object of mathematics education research.

THE IMPORTANCE OF RESEARCHING RESEARCH

Elsewhere we have examined the literature in order to study the discourses of mathematics education research concerning "power" and the "political" (e.g., Pais, 2011, 2012a, 2012b; Valero, 2008; Pais & Valero, 2011). Our fascination with researching research has to do with the fact that we conceive of research as an activity that, by examining mathematics education practices in classrooms and schools, generates particular systems of reason (Foucault, 2004), cultural theses (Popkewitz, 2009a) or ideologies (Žižek, 1989) that format what is possible to think about practice. In this sense, mathematics education research is not an innocent activity producing a diagnosis of the state of mathematics education practices or proposing solutions to the problems of practitioners. Rather, it is an active participant in shaping, discursively, the possibilities of seeing and inventing practice (Valero, 2010). Research produces languages and tools, which shape what we see and say about the very same world of mathematics education. As Brown (2008) argues, the theoretical and analytical lenses we deploy in our research "comprise particular choices in terms of the analytic filters that we apply, governed by underlying ideological motivations and trends of which we are not always aware" (p. 249). For us, a study of mathematics education practices as being political has necessarily to cover research and its discourses, and the way in which such discourses contribute to the formation of particular subjectivities and ideologies in and through mathematics education.

In this article we focus our analysis on what counts as theory in mathematics education research, and take advantage of the considerable number of recent publications – comprising conference proceedings (PME33, ICME11, CERME), special journal editions (ZDM), book chapters (Cobb, 2007; Silver & Herbst, 2007) and books (Sriranam & English, 2010) – addressing this issue. Since any theory of learning is an analytical framework, which not only describes but

also constitutes research objects (Lester, 2010, p. 70; Presmeg, 2010a, p. 98), these studies offer an opportunity to map the theses that emerge in the field about what are the objects of its study and how researchers productively deal with them. For our purposes here, we have focused our analysis of the texts on the question: What is the object of mathematics education research as expressed, implicitly or explicitly, in these publications?

Notwithstanding the plurality of approaches, and the variety of discussions, the reading of the texts reveals that there are three common threads. First of all, there is general agreement that mathematics education research is about the learning – and as a correlated variable also teaching – of mathematics. This is nothing new. Since the first ICMI study of reflexivity in the field, participants clearly expressed this position: Mathematics education research is a discipline which studies "the practice of mathematics teaching and learning at all levels in (and outside) the educational system in which it is embedded" (Sierpinska & Kilpatrick, 1998, p. 29). What we find interesting is the observation that this statement applies to studies adopting strictly psychological or mathematical frames, as well as many of the increasing number of studies within the social and political turn. For the latter, "mathematics learning" is pivotal. The difference is that there is recognition that such learning is influenced by other "factors" such as the social, political, or cultural conditions of students, families or schooling, that affect mathematical learning, as if those "factors" were separable aspects of learning and not the very same core of mathematics education practices.

The importance of considering theoretical frameworks other than those traditionally focused on psychology, cognition and affect, is justified by the fact that learning of mathematics typically originates in classrooms, and these are first of all social, cultural and political spaces (Presmeg, 2010a, p. 98). As a way of addressing the complexity involved in the teaching and learning of mathematics, Lesh and Sriraman (2010) suggest that mathematics education should be viewed as a *design science*, where researchers draw on multiple theories, driven by the need to improve the work of practitioners by solving the complex problems of learning and teaching as they occur in sociocultural environments. In this way, the power of design sciences comes from considering the "messiness" of teaching and learning, which are influenced by social constraints and affordances (English, 2010, p. 122). Some authors use the word *bricoleur* (Cobb, 2007; Lester, 2010) to describe the researcher as someone who uses different theoretical sources to suit his/her goals, which are described as aiming "not only to deepen our fundamental understanding of mathematics

learning and teaching, but also to aid in providing practical wisdom about problems practitioners care about" (Lester, 2010, p. 83). Only at the end of the latest and quite extensive book on theory (Sriraman & English, 2010a) is research on topics such as critical mathematics education, equity and marginalised students addressed in the chapter "Politicizing mathematics education: Has politics gone too far? Or not far enough?" (Sriraman, Roscoe & English, 2010). Here, the authors elaborate what they consider to be the cultural, social and political nature of mathematics. It can be summarised under two central questions: Why is school mathematics involved in the exclusion of particular groups of people considered to be disadvantaged? How can research to change this tragic reality be developed? They refer to the works of Eric Gutstein, Ole Skovsmose, Leone Burton, and Ubiratan D'Ambrosio among others to exemplify research on the cultural, social and political nature of mathematics. They regret that some of these studies – such as the more philosophical writings of Skovsmose (e.g., 2009) – do not provide ideas for teaching (p. 625). In commenting the paper by Sriraman, Roscoe and English, Yasukuwa (2010) concludes by arguing for the need to politicise mathematics education, and she raises important questions for research:

> What mathematics is really needed to be *learned* for people to become active citizens? What *knowledge* (including mathematical knowledge) and critical *thinking skills* are needed for students to interrogate the practices of qualculations [sic] that are defining principles of equity and fairness in particular ways, and not other ways? (p. 642, our emphasis)

Yasukuwa's understanding of politicisation of mathematics revolves around learning, and the way to achieve the high goals of equity and fairness is regarded in terms of mathematical knowledge.

A second thread in the texts we analysed is the explicit formulation of the purpose of mathematics education research: to improve the teaching and learning of (mostly) school mathematics (e.g., Lerman, 2010; Niss, 2007). The reasons for improvement may vary, but among the most common are supporting and developing intelligence, spreading high morals, strengthening self-confidence and consolidating democracy (Lundin, 2102). However, it is largely assumed that mathematics education research is supposed to function if not as the solution, then at least as a crucial force in the everlasting battle of assuring "mathematics for all",[2] so that a better society can be possible (Bishop & Forgasz, 2007; Skovsmose & Valero, 2008). Lundin (2012) has discussed

[2] A slogan propagated in the last decades by national policy and curricula (e.g., the United Kingdom's national curriculum, see http://www.education.gov.uk/schools/teachingandlearning/curriculum/secondary), professional organisations (e.g., NCTM, 2000) and researchers (e.g., Presmeg, 2010b) alike.

the fallacy of this line of argumentation. What he calls the *standard critique* of mathematics education consists of describing the current state of affairs of school mathematics as suffering from a variety of malfunctions, and the role of mathematics education research to fix them. By analysing the way mathematics education research engages with "word problems", Lundin shows that not only research cannot solve these malfunctions, they are ultimately created by mathematics education research itself. This is because the common idea that mathematics is becoming more and more important for the future of society – and without such knowledge young adults are disadvantaged and vulnerable[3] – is not an objective reality, but concomitant to "the formation of a perspective which makes the world appear in such a way as to make this competence relevant" (p. 4). The importance of knowing mathematics in order to understand and master the world, far from being a given reality, is the result of the frenetic activity of all those who believe in it. Lundin calls it an engagement en masse in pretending that school mathematics can help students understand the world (and lead ultimately to a betterment of society), and concludes this way:

> The proponents of the standard critique are thus in a sense more right than they could ever imagine when they argue that mathematics education is a central and necessary part of modern society. While mathematics may not be very useful as a means to understand and control the social and physical reality, the argument of this article shows that the very attempt to make it useful contributes in a fundamental way to the very constitution of the peculiarly modern reality in which we imagine such use to take place. (p. 11)

A third thread in the texts is that the specificity of mathematics is normally invoked by researchers to differentiate mathematics education from other fields of educational enquiry. In this field, "[…] mathematics and its specificities are inherent in the research questions from the outset. One is looking at mathematics learning and one cannot ask these questions outside of mathematics" (Sierpinska & Kilpatrick, 1998, p. 26). From this perspective, the specificity of mathematics comes from the object "mathematics", its intrinsic characteristics as a science, and its value as knowledge of competence. However, if we follow the twist given by Lundin, the specificity of mathematics can also be understood in terms of the role it has played in educational systems, not as knowledge or competence, but as a means of *governamentalisatio*n (Foucault, 1991). And, as a school subject, it has been doing this better than any other part of the school curriculum (Popkewitz, 2004).

In pointing out these three threads in the discourses that seem to emerge from the theoretical texts on mathematics education – the centrality of learning when thinking about education, research

[3] The examples are numerous, and Lundin (2008) traced this discourse to at least the end of the nineteenth century.

as providing the solutions for practice and the specificity of mathematics – we are not expressing our dis/agreement with these assertions. We are problematising the effects of the discourses in mathematics education to the Political. We argue that because the object of mathematics education research is structured around "learning" and "mathematics" inhibits a political conceptualisation of the field. In what follows we address closely how, on the one hand, "learning" has been used to make school mathematics an efficient mechanism of bio-politics and, on the other hand, "mathematics" functions as the sublime object of the field's ideology, making it difficult for researchers to conceive of its importance in terms other than knowledge and competence. In both cases, mathematics education is defined not by its intrinsic characteristics, but by the crucial discursive and ideological role it plays within educational systems and society.

THEORIES OF LEARNING IN MATHEMATICS EDUCATION

In mathematics education research the word "theory" is mostly taken to refer to "learning theory". This is particularly evident in the articles by Cobb (2007) and Silver and Herbst (2007). For instance, Cobb identifies experimental psychology, cognitive psychology, sociocultural theory and distributed cognition as the most influential philosophies informing the field. He concludes by suggesting that researchers should deal with these different theoretical trends – he uses the term "bricolage" – as long as they provide better designs for the task of improving the teaching and learning of mathematics. In comparison, Silver and Herbst (2007) argue for the necessity to move towards a *grand theory* that could help us organize the field, "much in the same way as evolutionary theory has produced a complete reorganization of biological species" (p. 60). And they propose to view theory as a mediator between problems, practice and research. Mathematics education research is formulated as a science of treatment that, by understanding the symptoms of students' difficulties in mathematics, aims to design and apply proper treatments, with the hope of curing defects in learning: "The evolving understanding of the logic of errors has helped support the design of better instructional treatments, in much the same way that the evolving understanding of the logic of diseases has helped the design of better medical treatments" (Silver & Herbst, 2007, p. 63). Despite the differences in how to organise theory, both for Cobb and Silver and Herbst, what determines what a theory(ies) of mathematics education should be depends upon whether it(they) allows the researcher to investigate the learning of mathematics.

Sriraman and English (2005, 2010b) contest the claim that the field should move towards a unified theory – as suggested by many who dislike the proposal of "bricolage" and would like to make of mathematics education a "normal science" in the Kuhnian sense (e.g. Silver & Herbst, 2007). They stress the difficulty of abstracting in one single meta-narrative the multiple and diverse practices of mathematics education. These practices are embedded in different social and cultural contexts that needed to be taken into account, rather than blurred for the sake of theory edification. This perspective resonates with what is usually called *postmodernism.* Postmodern theorists turn up their noses at concepts such as "universality" or "totality" (Lyotard, 1984). Instead, they emphasise the existence of multiple realities, each one with its own universality:

> The shift from metanarratives to local narratives and from general theories to pragmatic strategies suggests that in place of assuming a universal mind or a rational knowing subject, we imagine multiple minds, subjects, and knowledges reflecting different social locations and histories. (Seidman, 1994, p. 5)

This is particularly the case with research within what Gutiérrez (2010) has recently called the *sociopolitical turn in mathematics education.* She states, "educators who take a socio-political perspective stance recognize that mathematics education is identity work" (p. 17), and they engage in transforming it in ways that privilege more socially just practices towards marginalised students. This underlines equity and social justice, and the political role of mathematics education for researchers and practitioners. What is the role of theory in an approach that takes mathematics education as a cultural, social and political practice? Again, the answers vary, and the articles from Gutiérrez (2010) and Sriraman, Roscoe and English (2010) present interesting and varied accounts. However, we notice the centrality of learning in the way theory is perceived. Notwithstanding the authors' awareness of the political nature of school mathematics, when thinking about mathematics education researchers direct their efforts towards the amelioration of the process of teaching and learning mathematics, whether through identity work involving marginalised students (e.g., Gutiérrez, 2010), engaging in mathematical task-building in relation to the political problems students experience (e.g., Gutstein, 2006), exploring with students examples of "mathematics in action" in society (e.g., Skovsmose, 1994), or valorising different cultures in the classroom (D'Ambrosio, 1994). Although many of this research takes advantage of theories than can hardly be considered theories of learning – for instance, Skovsmose draws on Critical Theory to develop a critique of the role mathematics plays in society – the solutions for the problems of practice are considered in terms of the practice alone.

In what follows we focus mainly on the role of theory as seen by Cobb and Silver and Herbst. Moreover, we analyse research within the sociopolitical turn in the section "The specificity of mathematics".

1.1 Learning and bio-politics

According to Biesta (2005), the tendency towards the *learnification* of education, that is, the reduction of the study of educational phenomena to the study of administrable, engineerable learning processes, contributes to erase political considerations from educational research. This is part of a larger societal trend that addresses fundamental social problems as if they are the object of expert management and administration (Agamben, 1998; Foucault, 1991, 1997). Foucault (1991, 1997) shows us that the government of life is achieved through two fundamental *technologies* that act upon the individual and the population. On the one hand, the *technologies of the self* refer to the processes of subjectification that force individuals to bind themselves to their own identity, defined by the degree of adherence to social norms. On the other hand, the *political techniques* or *bio-power* refer to the way the state assumes and integrates the care of natural life of individuals into its very centre.

As an example of the first, we can describe research in mathematics education as a technology of the self. Popkewitz (2004) evidences the mechanisms through which school mathematics constructs a set of learning standards that are closely related to the administration of children rather than to an agenda of mathematical knowledge. Mathematics pedagogy, based on psychology and social psychology, generates knowledge about children and how they can effectively appropriate the mathematical content to acquire competences, behaviours and attitudes (e.g., being participative, competent, having self-esteem). From this perspective, school mathematics serves the appropriation of behaviours and modes of thinking and acting that make each child governable. Mathematics education research provides the precise labels and techniques to effectuate the *governmentalisation* of children through school mathematics. The concern of researchers for improving mathematical learning is the fuel for the effective instalment of technologies of the self.

As an example of bio-power, we can mention the recent emphasis on measuring and evidence-based research that fully reduce human beings to numbers representing mathematical performances. The mass scale comparative studies as, for example, the Trends in International Mathematics and Science Study (TIMSS) and the OECD Program for International Student

Assessment (PISA) represent the most prominent manifestation of this phenomenon. These international, comparative, measurement studies are to an increasing extent brought into the political sphere placing pressure on national governments to regulate their educational systems according to the standards stipulated by the tests (Biesta, 2009; Wilson, 2007). This is what has been happening in the last eight years in many developed countries where education tends to be transformed, on account of politicians' demands for accountability, into an evidence-based profession. Consequently, political measures contribute to formatting teaching and learning of mathematics in a clear and crude way. Teachers tend to tailor their instructional practices to the format of the test, out of concern that if they design their teaching differently their students will fail. Although they might know all the didactical novelties and methods to promote learning in a meaningful way to students, they will "educate" their students in the ways the system considers to be legitimate (Lerman, 1998; Wilson, 2007). Research supporting the construction of these systems and their implementation by teachers in classrooms are highly implicated in setting these mechanisms into operation.

The interplay between the two mechanisms of subjectification – techniques of subjective individualisation and procedures of objective totalisation – creates a twofold political strategy which Foucault (1997) calls *bio-politics*: the growing inclusion of human natural life (as opposed to political life) within the mechanisms and calculations of power. In this way politics is made operational. Its purpose is no longer to be a place where alternative emancipatory ways of living together can be thinkable, but to engage in the global regulation for the sake of the species' biological reproduction. For Agamben (1998), who enlarged upon the work of Foucault, the only real question to be decided is which form of organisation would be the most suitable for the task of securing the care, control and use of *bare life*: human life stripped from its entire political dimension and reduced to its biological entity. Human bare life is that type of existence that can be measured, calculated and predicted. In other words, it is the object and result of technical expertise. Recognising this condition, Žižek (2006) argues that today we live in a *post-political* society: politics have surrendered to specialised social administration, targeting the bare life of the individual by controlling its fluctuations according to global standards of normality.

Just as politics is being replaced by administration, education has given up its place in favour of learning and specialised, subject-matter pedagogy and didactics. In the case of mathematics education research, the privileging of learning theories functions as a mechanism of

bio-politics in constructing certain subjectivities and governing then, stripping them from their political condition. In the following we illustrate how such a mechanism operates in one of the recent socio-cultural theories on mathematics education.

1.2 Ideology and bio-politics in operation

The *cultural theory of objectification* (Radford, 2006a, 2006b, 2008) is arguably one of the most solid and well-documented theorisations about teaching and learning mathematics within a socio-cultural framework. Taking advantage of Vygotsky's and Leontev's cultural, historical psychology, and also Husserl's and Pierce's phenomenological epistemologies, Radford presents learning as the reaching of a culturally-objective piece of knowledge that students acquire through a social process of *objectification* mediated by signs, language, artefacts, the body and social interaction as they engage in cultural forms of reflecting and acting. He deals with the dichotomy of the individual and the object of knowledge by introducing the notion of *learning as being*, as a dialectical process where learning is both *objectification* (knowing) and *subjectification* (being or becoming). Learning is more than constructing logico-mathematical, mental structures or picking up ready-made knowledge. It is also an ethical and political activity where the subject is constantly renewed and constructed in the meeting with culture: "The meanings circulating in the classroom cannot be confined to the interactive dimension that takes place in the class itself; rather they have to be conceptualized according to the context of the historical-cultural dimension" (Radford, 2006b, p. 21, 22).

The theory apparently allows to be addressed the historical and cultural context, within which the meanings of being a student and a teacher are constituted – that is, the social identifications they are subjected to. However, when reading analyses of empirical classroom materials, the emphasis on the micro-situations seem to leave aside their 'historical-cultural context'. History and culture seem to get concentrated in the history of the culture-bounded mathematical object being objectified, and in the teacher's awareness of such constitution to guide the student's mathematical explorations. We are left with the impression that the subject – and his or her historical, cultural, political and social constitution – is thrown out of the equation. What remains is a mathematical student with the desire to learn. The usefulness of the theory for presenting a strong interpretation of the "learning of mathematics" seems to force the researcher to ignore all the "non-mathematical" complexities of classroom. The result is that learning is portrayed as an encounter between a piece of historic content and a subject who desires to learn it.

The theory and the analyses captured our attention because Radford claims to draw on Marxism (Presmeg & Radford, 2008). In our view, the construction of a Marxist inspired theory of learning without the full recognition of the political *economy* that Marx put forward ends up amputated (Jameson, 1991; Žižek, 1995). By disavowing the fundamental economic dimension of Marxism, the cultural theory of objectification may produce a case of what Žižek (1995, p. 9) calls "progressive amnesia": Marxism is recovered but deprived of its most fundamental core. Thus, the theory falls short of bringing an understanding of mathematics education practices within the Political, even if that is its original intention. Furthermore, by presenting a discourse that appeals to a political dimension, the theory may easily be guided towards an effective reduction of the political life of subjects to their acquisition of mathematics.

THE SPECIFICITY OF MATHEMATICS

In the review of Sriraman and English (2010a), Fried (2011) raises the question of the specificity of mathematics within what he calls "the new socio-political mathematics education" (p. 8). In his reading, the centring of mathematics education around the issues of equity and social justice turns these themes into the content of the field, while at the same time, and paradoxically, posits mathematics as a privileged space for social change:

> As a theory of mathematics education, this new socio-political mathematics education, therefore, says (a) that mathematics is not at the heart of mathematics education and must be subordinated to more general social issues, or, at the other extreme; (b) that mathematics has a privileged position in dealing with global social problems such as poverty and gender inequality (Fried, 2011, p. 90, 91).

There are two important aspects here that are relevant to a discussion of the specificity of mathematics. Firstly, mathematics education, as an educational practice, is immersed in the political arena of schooling. Although it seems clear that learning mathematics is different from, for instance, learning geography, there are important common educational problems that outweigh the specific problems of any school subject. If the community recognises that, when dealing with the process of teaching and learning mathematics in schools, there are social and political "aspects" that influence it, how does research address such dimensions? Finding answers to this question has led mathematics educators to the social and political turns (Gutiérrez, 2010; Lerman, 2000). It is difficult to maintain that we can analyse certain problems involved in the learning of mathematics only within the domain of psychology and mathematics. Even researchers who fiercely defend the

centrality of mathematics in the definition of mathematics education, end up asserting that, with regard to teaching and learning mathematics, "[a]ll that is needed is time, patience, desire and empathy" (Eisenberg & Fried, 2009, p. 146). None of these conditions have anything to do with mathematics. Time is obviously an economical and political variable, which many teachers complain is never enough, and patience, desire and empathy are psychological or psychoanalytical attributes.

When problems appear that cannot be explained within the theoretical straitjacket of mathematical learning, they tend to be, as noted by Gates and Zevenbergen (2009, p. 162), discarded since it is not the responsibility of mathematics education to address such "political" issues. This can be the case even within studies in the social turn. For example, Abreu, Bishop and Presmeg (2002, p. 4) state that changing school mathematics practices "depends of course on changing the formal educational structures that determine and shape the particular mathematics education practice experienced by the students in their schools". However, they promptly add that such a task "is beyond the scope of this book". Although many researchers acknowledge the social and political aspects involved in reforming mathematics education, they end up investigating problems as if they could be solved through better classroom practices.

Indeed, the accepted aim of mathematics education research as provider of solutions for the betterment of teaching and learning practices (Cobb, 2007; Niss, 2007; Silver and Herbst, 2007; Sriraman and English, 2010b) sharply contrast with the fact that, despite the amount of research produced in the last three decades, we are far from achieving equitable mathematics education of a high quality for all (Atweh et al, 2010). Some authors would even argue that the situation has worsened in the last two decades (Baldino & Cabral, 2006; Gates & Vistro-Yu, 2003). In the face of this fact, some researchers have pointed to the discrepancy between the increasing sophistication of research and persistent failure in school mathematics worldwide (e.g., Eisenberg & Fried, 2009; Lesh & Sriraman, 2005). For example, such a problem is commonly viewed in terms of the gap between research and practice. This is particularly evident in the way the role of theory is defined. Whether theory is considered as a mediator between practice and research (Silver & Herbst, 2007), as informing designs for the classroom (Cobb, 2007), or as a mean of political awareness (Sriraman, Roscoe & English, 2010), the assumption is that theory should result in some kind of "insight for action" for the betterment of the work of teachers and students: "it remains one of our many

challenges to clearly demonstrate how theoretical considerations can enhance the teaching and learning of mathematics in the classroom and beyond" (Sriraman & English, 2010b, p. 11).

In this respect, the problem is displaced from research itself and posited on the way governments, schools and teachers fail to "acquire" and implement the knowledge originating from academia. In research everything goes well; we know the best methods, theories and strategies. The problems of implementation rest in the school settings. It is then that researchers argue we are dealing with a truly political problem, and mathematics education, as a field of scientific enquiry, can do little within the spectrum of the broader social order. Even though the problem of providing "mathematics for all" is far from being strictly didactical – as generally acknowledged (e.g., Abreu, Bishop & Presmeg, 2002) – the research is carried out *as if* it actually was. We argue that the field, by the way it disavows the Political (Pais & Valero, 2011) and perceives itself as a reformist force, is in fact generating the problem. This is in tune with the standard critique (Lundin, 2012) previously mentioned, and also with the research developed by Klette (2004), who argues that the lack of change in mathematics education reforms is not just a problem of "application" but also an embedded part of research itself. She argues that the "denial of change" (p. 3) is being constructed from the beginning, in the theoretical, methodological and conceptual ways in which research is done.

How is this discussion related to the specificity of mathematics? We need now to consider the second aspect involved in the quotation from Fried (2011) above. While a sociopolitical theory apparently discredits mathematics, it actually increases its importance by regarding it as a privileged science, which can resolve problems that, in their very nature, are political and economical. Mathematics is flagged as the "thing" that allows not just the proper qualification for certain professions, or some kind of personal joy (Boaler, 2009), but also to solve the problems of social justice, oppression, poverty, sexism or racism. Mathematics – or the lack of it – is posited as the object which seems to be missing in a world full of inequalities (Lundin, in press). This was particularly evident during the 1960s, with the Sputnik Shock. The United States reacted by positioning mathematics and its education as crucial knowledge for surpassing the Soviet Union in scientific, technological and economical terms (Kilpatrick, 1997). Even today, mathematics and science are the school subjects that will secure a winning position in the global market (e.g., OECD, 2006).

Žižek (1989) calls these objects *sublime objects of ideology*. And Lundin (in press) takes them into consideration when he asserts that:

> Even though the term "mathematics" refers to an enormously rich variety of ideas, methods, algorithms, techniques and, if you like, institutions and practices, it does not contain the answer to the these problems [poverty, segregation, lack of democracy, economical growth, etc.] I claim that the very idea of mathematics as commonly conceived should be understood as a symptom of the society which believes in it. It helps us make sense of the puzzle, but simultaneously makes serious rearrangement of the pieces seem unnecessary (and impossible or even absurd). (p. 11)

As suggested by Lundin (2012) apropos the use-value of mathematics – in optimising the mundane activities of people – while its utility may not be very important in eradicating racism, sexism, economical inequality and the like, the very attempt to make it important contributes in a fundamental way to the formation of a reality in which we imagine such importance to take place. As such, mathematics education is politicised by means of a *de-politicisation* of issues of equity, social justice, economy and, ultimately, politics itself.

We contend, therefore that the 'specificity of mathematics' has been functioning as the *fantasy-scenario* (Žižek, 2006), disabling the community from a true comprehension of the role mathematics education plays within the Political. This is the basic definition of Lacan-Žižek's notion of ideology[4]: a totality set on effacing the traces of its own impossibility, by means of displacing the internal and all-pervasive contradiction of society – where inequality, exclusion and injustice prevail – with an external and contingent series of events that could be approached by mathematics education. Instead of positing itself in the picture as part of the problem, research ends up creating ideological injunctions whose purpose is precisely to disavow such reflexivity. In short, in the well-intentioned action of achieving a better world through mathematics education, sociopolitical research fails to acknowledge, in the corrupted reality in which they lament, the ultimate consequence of their own act.

Even within cultural, social and political studies a strong disavowal of the political takes place. By positing mathematics as a "weapon in the struggle" for a better world (Gutstein, 2012), this reinforces even more "faith" (Lundin, 2012) in the idea that better mathematics is the solution for problems that by their very nature are economical and political. Ultimately, to paraphrase

[4] In recent works (Pais, 2011; Pais, 2012a; Pais, 2012b; Pais, Fernandes, Matos & Alves, 2012; Pais & Valero, 2011), we have chosen particular topics of research – equity, transfer, ethnomathematics, critical mathematics education – and addressed them as ideologies designed to conceal the real of what we call the economy of schools.

Lundin (2012), the very idea of a simultaneous formation of competence to read and change the world using mathematics and a perspective which shapes the world in a way that makes this competence relevant, is peculiar to and characteristic of mathematics education research. Lundin's conclusion, which accords with our own, positions us at a threshold: If the purpose is the high ideals of democracy, social justice and equality, "the route via mathematical thinking, in which we currently invest so much, is a dead end and that we thus need to look for other ways forward" (p. 11).

FINAL REMARKS

It now becomes clear why we have been referring to the Political with a capital P. We do so in order to distinguish what has been in fact a "politicisation" of a series of domains previously considered "apolitical" by socio-political research in mathematics education, from a political conceptualisation of mathematics education itself. While the former is centred on the issue of change conceived in terms of what Seidman (1994) calls "politics of difference",[5] and concerned with changing identities (Gutiérrez, 2010), the latter opens the possibility of calling into question the very structuring theses of discourse orienting research practice. Thus, we completely support Sriraman and English's contention that a socio-political approach "forces one to re-examine the fundamental nature and purpose of mathematics education in relation with society" (2010b, p. 25, 26). However, we emphasise how the very notion and form of the "political" within which a socio-political perspective operates is grounded in the *depoliticisation* of research.

We sought to show the deadlock produced by the theses that research discourses fabricate about the *object* of research, maintained by the learnification and the mathematical specificity dominant in theory. Such situation inhibits a conceptualisation of mathematics education within the Political. Indeed, other researchers have been using similar theoretical frameworks to the ones we use here. Tony Brown, Margaret Walshaw, Tânia Cabral, Candia Morgan and Roberto Baldino, among others, have for some years been dealing with Foucault, Lacan and Žižek in their investigations. They have provided different and challenging readings of the teaching and learning of mathematics, and regretfully their work goes generally unaddressed in the studies on theory we analysed. But contemporary theory – particularly that stemming from the works of Foucault and Žižek – makes

[5] But also "politics of recognition" or "identity politics". See Butler, Laclau and Žižek (2000) for an account of the terms in which the relation between "politics" and "Political" is carried within contemporary theory.

possible for us to posit also mathematics education research itself as an object of study. Such is, in our view, the potential of the research carried out in this article. That is, research that, by teasing out the assumptions and discourses generated in other studies, allows us to 'estrange' us from the self-evidence of mathematics education as an established field of scientific enquiry. It is our contention that such an approach, although not directly aimed at providing some kind of insight for action, can help us redefine the coordinates we use to make sense of the problems of the field.

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